

REMARKS

Claims 1-9 were rejected as unpatentable over Claxton in view of Apelewicz in view of Kost. Applicant requests reconsideration.

Apelewicz describes quadrature processing. Applicant concedes that processing one baseband signal or two signals in quadrature is a matter of application, and that quadrature processing in the complex format would be obvious. However, the combination of Claxton and Kost does not suggest the present invention.

Claxton is directed to front-end electronic processing of single input signal for use in a channelizer. The front-end electronic processing includes low noise amplifiers and mixers with a single ADC used to convert an amplified and downconverted analog signal into digital form. The digital output of the ADC is the only input into the channelizer 22. The channelizer may be selected from a number of well-known digital channelizers and possibly a number of channelizers may be used with a switch. Claxton does not discuss the limitations of the ADC sampling rate. Claxton does not discuss the number of quantizer bits. Claxton does not discuss how such limitations may be overcome when the bandwidth of the wideband signal at the channelizer input is so high that a single ADC may not be available to achieve the required sampling rate and number of quantizer bits. In Claxton there is a channelizer 22 having a single digital input and a plurality of channelized outputs. The Claxton reference is merely an example of a use of a prior art

1 channelizer that could be a polyphase channelizer with an internal
2 commutating function.

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4 Kost describes an analog-to-digital (ADC) conversion system
5 for wideband signals. The system includes a plurality (two) of A/D
6 converters (ADC), a digital-to-analog converter (DAC), and a
7 digital signal conditioning stage. The Kost system permits a
8 sampling rate that is a multiple of a single ADC. The Kost system
9 however does not describe any channelization, but merely uses a
10 plurality (two) of polyphase samplers and converters for providing
11 polyphase digital output. The Kost system then recombines the
12 polyphase digital outputs into a single signal 57. So, when fairly
13 read, Kost teaches splitting, polyphase staggered sampling, and
14 subsequent combining for increasing the sampling speed.

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16 In the present invention, the polyphase ADC 14, including the
17 samplers 34a-m and converters 36a-m provides a plurality of digital
18 outputs that are time staggered. These time-staggered samples are
19 fed directly into a polyphase filter bank 42a-m. Time staggering
20 for purposes of channelization has been performed in the prior art
21 channelizers by internal commutators, not shown in the cited
22 references. The present invention does not include a commutator for
23 channelizing a sampled digital input. The combination of Claxton
24 and Kost does not teach or suggest that these time-staggered
25 samples in Kost can be directly fed into the polyphase filter bank
26 for eliminating the need for a commutator.

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1 Particularly, Kost shows a plurality of staggered signals that
2 are combined. Claxton shows a channelizer having a signal input.
3 The combined signal 57 of Kost would be fed directly into the input
4 of the channelizer 22 of Claxton. Kost teaches a single combined
5 output and Claxton teaches the use of a single input to the
6 channelizer. The combination of Claxton and Kost suggests, when
7 fairly read, to polyphase stagger sample the input signal for
8 increased speed of sampling using slow speed converters, combine
9 the staggered samples as a single input, and feed that input into
10 Claxton's channelizers.

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12 Claxton and Kost do not suggest to replace the prior art
13 single sampler with a bank of samplers for providing polyphased
14 staggered signals that are effectively commutated. Kost teaches
15 staggered sampling for improved speed. When applied to Claxton's
16 conventional channelizer, the staggered digital output would not be
17 applied to the single input to the channelizer 22. Kost certainly
18 does not suggest using a bank of samplers and converter for
19 eliminating the need of a commutator by feeding the staggered
20 digital output into the polyphase filters. In the present
21 invention, the bank of samplers and converters effectively
22 functions as a commutator. The present invention is well deserving
23 of patent protection. The present invention does not include a
24 commutator, necessary in Claxton to channelize the single input
25 into a plurality of commutated polyphase digital outputs. Rather,
26 the present invention uses polyphase staggered sampling and
27 converting as an extension of Kost and applied to channelization
28 for a new purpose, and that is to perform both high-speed sampling

1 and polyphase commutating during channelization. As such, the bank
2 of samplers and converters are not merely high-speed samplers and
3 converters but become, in effect, a front-end channelizer of
4 channelized digital outputs that can be then fed directly into the
5 bank of $u1-m$ polyphase filters. The polyphase staggered digital
6 outputs from the samplers and converters are directly fed into the
7 $u1-m$ polyphase filter bank 16 without the use of a commutator. The
8 combination of Kost and Claxton does not suggest the effective
9 front-end polyphase commutation through the use of a bank of
10 samplers and converters. In the preferred form, there is a one-to-
11 one and onto mapping between the sampled and converted digital
12 outputs to the $u1-m$ filters and the channelization outputs 48a-m,
13 but other mappings could be used. The present invention provides a
14 full bank of samplers and converters for effective front-end
15 polyphase channelization. In the present invention, the digital
16 outputs to the $u1-m$ filters are at a low rate of the samplers and
17 converters, and as such, the channelization function of the present
18 invention need not operate upon an ultra-high speed single input
19 signal for further cost savings with improved system performance.
20 The present invention not only provides high speed staggered input
21 sampling, as in Kost, but also provides effective channelization by
22 the samplers and converters without the need for commutation and
23 with polyphase filter banks operating on low sampled rates digital
24 input for improved performance.

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The combination of Kost and Claxton is a front bank of Kost's samplers and converters providing digital outputs that are combined as Kost's output 57 that is then fed into Claxton's conventional channelizers. Kost and Claxton do not teach feeding the sampled and converted outputs directly into a bank of polyphase filters.

Allowance of the claims is requested.

Respectfully Submitted

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11